CAR HEALTH MONITORING SYSTEM USING ARDUINO

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SUPERVISOR'S DECLARATION

I/We* hereby declare that I/We* have checked this thesis/project* and in my/our* opinion, this thesis/project* is adequate in terms of scope and quality for the award of the degree of Bachelor of Computer Science (Computer Systems & Networking)

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Date :

STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRAK

Kereta telah menjadi pengangkutan harian utama di Malaysia. Penyelenggaraan kereta tetap merupakan salah satu prosedur utama untuk mengekalkan prestasinya. Di samping itu, penyelenggaraan yang baik dapat mengurangkan risiko masalah kereta yang mungkin menjejaskan keselamatan pemandu dan penumpang semasa perjalanan dan mengurangkan perbelanjaan untuk membaiki. Penjagaan kereta yang baik boleh memberi ganjaran kepada pemilik dari segi masa, wang dan keselamatan. Dalam tempoh selang waktu, ia adalah tanggungjawab pemilik kereta untuk memantau keadaan kereta. Masalah enjin biasanya bermula dengan petunjuk kecil, peristiwa bunyi atau tidak teratur. Dalam memantau petunjuk tersebut, sistem pemberitahuan dikenali sebagai salah satu kaedah yang baik. Kini, telefon pintar menjadi penting dalam membantu kehidupan manusia. Oleh itu, projek ini bertujuan untuk membangunkan aplikasi mudah alih berasaskan android untuk memantau keadaan kereta di mana ia akan memaklumkan kepada pemilik mengenai pemanasan enjin kereta yang berlebihan. Metodologi yang telah dilaksanakan dalam projek ini ialah Pembangunan Aplikasi Rapid (RAD) yang mempunyai empat fasa termasuk perancangan keperluan, reka bentuk pengguna, fasa pembinaan dan pemotongan. Projek ini dibangunkan berdasarkan model yang dicadangkan untuk pemantauan pemanasan motor yang berkesan. Sistem ini menggunakan Arduino dan React Native untuk aplikasi mudah alih yang digunakan untuk memisahkan parameter yang berbeza; yakni pemanasan motor untuk memastikan pemanduan dilindungi dan selalu berhati-hati. Data suhu terkumpul yang dihantar melalui internet akan diterima oleh pemilik mekanik dan kereta dengan menggunakan aplikasi tersebut. Unit perkakasan melibatkan Arduino, modul Bluetooth, LCD (Paparan Kristal Cecair), telefon pintar berasaskan android, sensor suhu dan modul pengesan parameter tertentu. Aplikasi ini diuji berdasarkan Ujian Penerimaan Pengguna dengan pelanggan dengan menguji sambungan bluetooth antara Arduino dan telefon pintar android, melihat hasil data masa sebenar yang disimpan dalam pangkalan data dengan memaparkan semua data yang diperolehi pada telefon pintar. Kesimpulannya, diharapkan projek ini dapat menyumbang kepada klien saya dan orang lain untuk meningkatkan gaya hidup mereka dalam menggunakan teknologi baru.

ABSTRACT

Car has become main daily transportations in Malaysia. Regular car maintenance is one of the key procedures to sustain its performance. In addition, good maintenance able to reduce the risk of car problems which might affect drivers and passengers safety while traveling and reduce the expenses for repairing. Good car care can rewards the owner in term of time, money and safety. In the interval duration, it is the car owner responsibility to monitor the car condition. The problem of machine will normally start with small indication, sound or irregular events. In monitoring such indications, notification system is known as one of the good methods. Nowadays, smartphones turn out to be essentials in assisting human life. Therefore, this project aim to develop an android based mobile application to monitor the car condition where it will notify the owner about the excessive heating of car engine. The methodology that has been implemented in this project is Rapid Application Development (RAD) that have four phases including requirements planning, user design, construction and cutover phases. This project is developed based on a proposed model for effective monitoring of motor heating. The system implemented an Arduino and React Native for mobile application which used to separate different parameters; i.e. motor heating to ensure the driving is protected and always cautious. The collected temperatures data which are sent through internet will be received by mechanic and car owner by using the application. The hardware unit involves Arduino, Bluetooth module, LCD (Liquid Crystal Display), android based smartphone, temperature sensor and particular parameter checking sensors module. The application is tested based on User Acceptance Test with the client by test the bluetooth connection between Arduino and android smartphone , view the real time data result stored in database by display all of the data retrieve on smartphone. In conclusion, it is hope this project can contribute to my client and other people to improve their lifestyle in using new technology.

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LIST OF SYMBOLS

°C	Celcius
A	Ampere
V	Voltage
mA	Mili Ampere

LIST OF ABBREVIATIONS

V	Voltage
MHz	Megahertz
Khz	Kilohertz
UML	Unified Modelling Language
IDE	Integrated Development Environment
USB	Universal Serial Bus
RAD	Rapid Application Development
RESTful	Representational State Transfer
API	Application programming interface
LCD	Liquid Crystal Display

CHAPTER 1

INTRODUCTION

1.1 Background

The increasing number of cars day by day is very challenging to solve problems for routine maintenance or repair of vehicles. The aggregate vehicle deals increased 41% to 68,465 units in July from 48,533 units in the Malaysia ("Malaysia vehicle sales in July second highest in auto industry - Business News | The Star Online," n.d.). Realize with the expansion number of car alongside with different type of transportation an issues related to the safety, improving the travel reliability and reduce cost in maintaining of the car owner are playing an important role. To counter this issues, the driver information plays an important role in supporting the needs of the issues.The car driver information can be continuous data on vehicle performance and the status of the internal components.

Therefore, the prototype of Car Health Monitoring System Using Arduino detector capable of assisting the process of measuring the temperature of an engine to warns the user about the overheating engine using temperature sensor is developed. The radio frequency technology that is bluetooth module on the prototype device via android smartphone application bluetooth connection module and the approach using RESTful API to communicate two software with each other by using custom mobile application development is developed.

The developed prototype device functioning by giving a value reading when the temperature sensor measure the temperature through the electrical signal and display the value on LCD display or on smartphone display via bluetooth . The data collected from the temperature sensor will compared with the standard temperature values. Beside that, the prototype can do a realtime monitoring on the smartphone by read the current status of temperature and store the data in the database.The exceed value of temperature will warn the user on smartphone. Once the temperature is varies, the data is sent to control

system. The control system acts as a vehicle notification center, where its primary role is to inform the driver through the application that has been installed on the driver smartphone device to repair their car as soon as possible which helps in improving the lifespan of the vehicle.

1.2 Problem Statement

Cars are the most widely used vehicles on the road. However not all users have high knowledge in car care. Drive a car to the workshop for maintainance is the best way for those who are not skilled in the process of vehicle maintenance. However, safety and cost are also the key factors that are always being emphasized by vehicle users. This is because, the vehicle is at a level that is below than satisfactory performance will negatively impact the consumer safety and other road vehicle drivers to involve with the accidents that can lead to loss of life while affect the costs to be borne by vehicle owners when the critical damage to the vehicle is used to cause more value for money for them to repair their vehicle.

1.3 Objective

The objective of this project are :

i. To study the technologies in implementing the real-time measurement on vehicle condition using Arduino and Internet of Things (IoT) concept.

ii. To develop a prototype that measure and monitor the temperature of vehicle condition

iii. To test the user acceptance of current car condition

1.4 Scope

This scope of the project is focuses on the

i. Using temperature sensor attached on Arduino circuit as physical hardware and mobile application connected via wireless technologies to view data and receive notification if overheated occurred.

ii. The application keeps the information of temperature sensor and stored into database.

iii. This project to analyze current solution and come out with architect design to have seamless integration between Arduino, mobile application and cloud database.

1.5 Thesis Organization

This thesis consists of five chapters that will be describe about the whole project that are currently being developed and studies. Chapter 1 is the introduction that will discuss the overview of project that are currently be doing and latest issue that are being study to overcome the problem related to be counter.

In chapter 2 will discover the literature review that are the comparison of the project that other researcher have been doing to encountered the problem. For this chapter the new proposed improvement method and technique will be introduced to make the current system more usable and flexible to be used.

Chapter 3 will discuss on the methodology applied to achieve the objectives in this study. All the practise method,hardware and software will be clearly state in here how it will going to be used and applied.

Next is chapter 4 that will discover the result and discussion. The result and discussion contains all the outcome and information that have been done in this project to achieve the objective goal in this carried out project.

Lastly , Chapter 5 is the conclusion of the project. This will explained about the sum-up and reached opinion how far the overall project that has been carried out are success to achieved of the goal and how the weakest of the project will be overcome in further studies.

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